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WESTERN SOUTH AMERICA AND ITS RELATION TO AMERICAN TRADE.

The current discussion of the Isthmian Canal project justifies a careful study of Western South America. Our present commerce with that section is almost insignificant, comprising less than five-tenths per cent of our exports last year, nevertheless, Colombia, Ecuador, Peru, Bolivia and Chile include a large section of a continent having natural resources capable of contributing abundantly to the world's commerce. Indeed, forces are now at work whose operation will in time make these resources available. The purpose of this paper is to consider the geography and commercial relations of Western South America with reference to American trade.

Western South America comprises the part of the continent commercially dependent upon the Pacific. The area of a region so defined cannot be a definitely prescribed one, because it must vary with the development of the means of transportation to and from the ports of either coast. The centres of South American population are all near the coasts, and the coasts to the north of the Tropic of Capricorn are separated by natural barriers that will always cause the commerce of both shore regions to depend for transportation upon the oceans toward which they front.

The interior of the South American continent is a vast plain so level that small boats can pass from the Orinoco to the Amazon, and at the season of floods go from the head waters of the Amazon to those of the Plata. This interior level plain is covered by an impassable jungle, through which the rivers are the only highways. Great areas of the country are annually flooded. The conditions not only prohibit settlement, but also debar commercial communication between the coasts except by means of the steamers on the Amazon River, which must wind their way through

three thousand miles of unhealthy and unexplored forests to reach the foothills of the Andes. The Pacific Ocean is, and must remain, the commercial highway for the Pacific Coast plain, the Andean plateau, and probably for a large section of the eastern slope of the Andes.

The ordinary Mercator's projection wall map of the world makes North America seem much larger than South America, and gives the impression that the western part of the South American continent has a small area. The length of the Pacific shore line of South America is 5,000 miles, a distance great enough to reach from the Nicaragua Canal into the Arctic Sea beyond Baffin's Bay. Even the part of it that is to-day engaging in the foreign trade is 3,200 miles long, the distance from Cuba to the latitude of Northern Iceland. The Andean Highlands are in places 500 miles wide. South America lies in two habitable zones, while the commercial part of North America comprises only the best part of one zone, the North Temperate, where the degrees of longitude are shorter than in torrid latitudes. The distance from the Everglades of Florida to the unexplored woods north of Ottawa, Canada, is less than 1,500 miles. South America extends north and south an equal distance in the corresponding South Temperate latitudes, and in addition, more than 2,000 miles across the Torrid Zone.

The area of Western South America is about 750,000 square miles, twice that of the original thirteen states of North America, and more than three-fourths as large as the states to the east of the Mississippi River. The climatic variations run the full gamut. The plateaus lift their mountains in equatorial latitudes beyond the snow line, and the range of humidity is such as to produce tropic morasses, and arid deserts. The variety of production corresponds with the range in climate.

Western South America is separated into six regions possessing distinctly different industrial characteristics. These industrial subdivisions are the Cauca Valley of South-

western Colombia, the Ecuadorean coast plain, the Peruvian coast plain, the mineral desert of Chile, the Chilean agricultural belt and the Andean Plateau. The greater part of Western South America lies within the Torrid Zone, but owing to its elevation, the climate is chiefly that of the Temperate Zone. Only two of the six industrial units of Western South America, the Ecuadorean coast plain and the Cauca Valley have a tropical climate possessing the temperature and humidity of Cuba and Porto Rico, and they are the smallest of all the divisions, containing less than a million people. A third division, the Peruvian coast plain, lying within the Torrid Zone, is by its aridity saved from the malaria of the usual tropic climate.

The total population of Western South America is about 10,000,000, more than twice as large as that of our own Pacific and Rocky Mountain States, but possesses such different characteristics as to preclude comparison on a numerical basis. A large part of the South American population under discussion is native Indian, another large part is mixed Indian and Spanish, and but a small proportion, not exceeding one-fourth, is of the dominant Spanish race. In South America, the white men have not driven out the Indian, who is industrially superior to the North American Indian, and may be compared with our negro. All authorities agree in stating that native South Americans are a peaceable race that can be successfully utilized for industrial purposes. In many plateau sections, these Indians own their homes and the small tracts of land from which they glean their living by crude methods of agriculture. In the tropic plain of Ecuador, the labor conditions are less favorable, and the debt laws are such that in a country where theoretic freedom prevails, the ordinary laborer is held in a condition of financial and industrial servitude by his creditor.

The several industrial divisions of the continent vary widely in their typical exports. The agricultural products

include, among other articles, the cocoa and rubber of Ecuador, the wheat of Chile, and the sugar, cotton, and skins and hides from Peru. Among the minerals are the unique desert products, nitrate of soda and borax, the coal of Chile, and the copper, tin, silver and gold of the Andes.

Western South America has two broad physical divisions, the Andean region and the Coast plain. The Pacific Coast plain includes four of the most widely contrasted of the industrial regions. Two are within the tropics: the Ecuadorean coast plain, with abundant moisture for tropic agriculture, and the arid Peruvian coast plain, where all animal and vegetable life depends upon the water from the snow fields of the Andes. The dryness of the atmosphere and the absence of fresh-water lakes give this section a more healthful climate than most parts of the tropics possess, and make it suitable for the white races to inhabit. Between this region of irrigation and the agricultural belt that lies in the temperate region of Chile, is a desert, differing from other deserts, however, in that it contains wealth. The rainless climate has caused the accumulation and retention in the soil of large quantities of salts that are elsewhere dissolved and carried to the ocean. The most important part of these minerals is the nitrate of soda, which is found in a continuous deposit paralleling the seashore for 150 miles, and estimated to cover 220,000 acres and contain 228,000,000 long tons—a quantity sufficient to last the world for many decades. The nitrate lies close to the surface under a layer of sand, but the deposits are at the elevation of 3,300 feet, and must be reached by railroads built for the purpose. It is now being exported in large and increasing quantities, and gives rise to a mining industry requiring much capital and employing many men. The crude product is boiled down and chemically treated in large plants requiring expensive machinery.

Water to supply the towns on the rainless nitrate coast is brought to the cities in pipe lines from the Andes, 150 to

200 miles away. Every other article necessary for sustaining the life of man or beast must be brought by sea from some more favored region. The imports come from many countries, but chiefly from the agricultural districts farther south, where the products are similar to those of our Pacific Coast States, with which Chile possesses some points of similarity.

Chile is long and narrow, but her area is large, larger, in fact, than that of France, Germany or the United Kingdom, or the combined area of the New England and Middle Atlantic States with Maryland and the Virginias added. Her length of 2,600 miles would reach from New York to Utah. The country extends from a tropic desert to Terra del Fuego where the latitude and climate are like those of Scotland, or of Alaska.

The temperate shores of the Pacific in North and South America, show a succession of corresponding geographic and climatic features. These resemblances would appear plainly if Chile could be inverted beside the coast of North America. The lower end of the inverted Chile would be opposite the City of Mexico, and Terra del Fuego would be about the latitude of Sitka, Alaska. The 800 miles of Chilean desert, with its nitrates, would lie along the arid coast of Mexico with its silver mines. Patagonia would be opposite British Columbia and Alaska, both regions being damp, fringed with rugged islands, and cut into sharp fjords walled in by forest-clad mountains with snow fields on their summits and glaciers on their sides. The tropical and cold sections can produce little except raw materials, but in the temperate belt of each region, civilization and diversified industry are possible. The climate is that of Western Europe, and the United States.

It is by comparing the productive region of the North Temperate Pacific with the South Temperate Pacific that the greatest geographic resemblances of the two coasts appear; likewise their only difference. This difference is due to the

absence of a South American duplicate for the State of Washington. California and Oregon are reproduced, but the Antarctic current, sweeping up the coast of South America, shortens the temperate section of Chile so much that the region corresponding to the State of Washington is replaced by a longer continuation of the rugged and forest-clad coast similar to that of Alaska and British Columbia.

Near the Mexican boundary of the United States and in latitude 29° , the resemblances to the corresponding agricultural parts of Chile are obvious. In Chile, the arid country by means of irrigation produces grapes, raisins, citrus and other fruits, and alfalfa, the alfalfa being used as supplementary fodder for the cattle pastured on the higher hills. The arid belt extends several hundred miles, and is succeeded on the south by wheat fields and general agriculture. The Chilean forests corresponding to those of Central and Northern California, Oregon, Washington and British Columbia, exist in the lower half of the Chilean agricultural region and along the extensive coast of Patagonia.

The best section of the western slope of both Chile and the United States is found in a great interior valley. The valley of California, bounded on the east by the Sierra Nevada, on the west by the coast range and drained by the Sacramento and the San Joaquin rivers, is widely known because of its fertility. Chile also has a valley similar to this, but larger and superior to it in several particulars. It is enclosed by the Andes on the east and by coast ranges near the shore of the Pacific; but these coast ranges are not so continuous as those of California, being broken at frequent intervals where rivers make their way to the ocean. Instead of being drained by two rivers flowing lengthwise and having one outlet to the sea, the Chilean Valley has several small rivers flowing across it and discharging into the ocean. The basins of these rivers are not separated by high divides, but are practically continuous, so that the whole district is properly spoken of as one great valley.

The Andes are higher than the Sierra Nevadas, and the westerly winds bring a larger amount of moisture than California has. The streams have a larger and more constant flow of water from the mountain snows and furnish an abundant supply for irrigation, and in some places provide good power. The conditions and crops here are essentially Californian, and the population of two and a half millions of people is equal to the entire population of our Pacific Coast States.

The mountain systems of the Andes form the two remaining industrial units. The less important of these is the valley of the Cauca River in Southern Colombia, where the ranges of the mountains separate to come together again farther north. The ranges toward the Pacific are lower than those north of this valley, and the only commercial outlet of the valley lies across them. The valley is as large as New Jersey. Half a million people live there, at an elevation of from 3,000 to 6,000 feet, in a climate that is tropical and sub-tropical. Southward from Colombia the mountains become higher and widen into the Andean plateau which extends through Ecuador, Peru and Bolivia for a distance of 1,500 miles to the Argentine boundary. This plateau, the sixth of the industrial divisions above-named, contains as great an area and population as do all the others combined. It has a cool climate, a fair labor supply, pastoral and mineral resources, and the possibility of taking an important place in the world's trade, from which it is at present almost entirely cut off by the lack of means of communication over the high and steep ranges of the Western Andes.

The foreign trade of Western South America is with Europe and the United States, and amounts to about \$160,000,000 per annum—an average of sixteen dollars per capita, or slightly more than half of our average. Comparisons of per capita foreign trade do not, however, throw much light on industrial conditions. Western South America

exports only raw materials and imports nearly all of the manufactures used. The United States having a great variety of resources and industries supplies most of her own wants, and her imports consist not only of special manufactures, but also of material needed by American industries. Our foreign trade of thirty dollars per capita represents a small part of our industrial activity, while in Western South America the foreign trade of sixteen dollars per person represents almost the entire commercial activity of a population industrially undeveloped.

The nature of the resources of Western South America is such that the region is likely to continue permanently in the extractive stage of industry, or at least till a period too remote for present consideration. Pacific South America is now but half of an industrial unit, the other half, the manufacturing complement, is in Europe and the United States, and can be reached only by a long and dangerous route. Each one of these industrial half units needs better facilities for marketing its produce in the other. One important service of an isthmian canal will be to unite these separated commercial and industrial complements.

Western South America bears the same relation to the manufacturing centres of Europe and the United States that New Mexico, Colorado and Wyoming, with their raw products, bear to the manufacturing states along the Atlantic Coast. The countries of the North Atlantic need, and are buying, the export products of the west coast of South America—the nitrate and the ores of silver, gold and copper, cotton, sugar, cocoa, coffee, hides, wool, rubber, woods and grain. In return for this export these South American Republics are importing from many countries, but chiefly from the United Kingdom, all kinds of manufactures, from pig iron to watches and silks. By increasing this trade, both parties will be benefited. The production of raw material will be stimulated no less than the production of manufactures. For any gain that comes to South America,

the rest of the world must receive an equal and complementary advantage.

The South American exports are about a third greater than the imports, the export surplus being in part an interest payment to the foreign creditors who have furnished the money for all the leading enterprises in this part of the continent. A small portion of the trade comes and goes by way of the Isthmus of Panama, but the bulk of it passes around Cape Horn or through the Straits of Magellan. European countries control the greater part of the trade, buying nine-tenths of the exports, and furnishing a slightly larger share of the imports. On the surface this is a discouraging showing for the United States, but our small influence there is the result of several causes which may be regarded as temporary, and which will probably have disappeared before the year 1920.

The first cause of Europe's trade superiority is the diligent care European merchants have taken to please their South American customers. Goods have been manufactured, packed, shipped and paid for in accordance with the desires of the purchaser, and this policy has been steadily pursued. Until recently the first concern of the American manufacturer has been the home market, and he has regarded the foreign trade mainly as an avenue for disposing of an undesired surplus. Scant attention has been given to the demands of foreign purchasers, and the American consuls all over the world have constantly repeated the complaint that our goods were not made or packed to suit the requirements of the markets to which they were sent. The past three years have witnessed a remarkable change in our attitude toward the foreign trade. Our exports have suddenly increased until we find ourselves leading the world, and commercial journals in Europe and America seem to be fearful of American supremacy. Accompanying this is the changed attitude of our manufacturers. They have come to realize their ability to export goods to all countries, and

are everywhere enlarging their business and studying the conditions necessary to win the foreign market.

The results of this change are noted by foreign consuls, who are now beginning to report to their governments that the American goods are shipped in the best form and are securing the trade. An example of this is the displacement in Chile of the heavy and expensive English threshing machines by the cheaper and lighter machine of American manufacture. This change of attitude, this focusing of our attention and effort on the export trade will produce great results in the next two decades.

A second cause of the present European superiority in the South American trade is the lower freight rates. For the last forty years the European exporters have been able to get their goods carried to Western South America at rates 15 to 50 per cent lower than those secured by the Americans. American exports are frequently sent to Europe for reshipment to South American ports. Europe imports largely from South American ports, and the outgoing vessels carry European goods very cheaply, and to the detriment of the American exporter. The effect of heavy imports on export rates is well illustrated in the competition of the European countries with each other. German shippers sometimes have an advantage of 25 per cent over the English on rates to Chile, because Germany is the largest importer of Chilean nitrate. British goods are sometimes shipped by way of Hamburg. The British commissioner, appointed to investigate the Chilean trade in 1898, pointed out this disparity of rates as one of the causes of the stationary trade of the United Kingdom with Western South America and of the growing trade of Germany with that section. Europe has better rates to South America than we have and more regular, frequent and rapid connections. We have the short cut across the Isthmus, but the rates charged by the Panama Railroad greatly restrict its use. For many decades our only other direct connection has been by sailing vessels, and in

this age of rapid transactions they are too slow and irregular to be depended upon in commercial competition. In 1899, our exports to the west coast were no more valuable than in 1875, yet the total of our exports to all countries is two and two-fifths times what it was twenty-five years ago. It is less than ten years since the starting of the first of two lines of steamers from New York. They have not caused much growth in our South American trade, neither have they reduced freight rates to the European level, and our consuls and merchants in Chile, Peru and Ecuador are still complaining of the inadequacy of our connections in comparison with those of Europe. The New York steamers have shown their superiority over sailing vessels by securing nearly all the goods carried by the sailers in 1890. They are always full loaded on leaving New York, and the recent addition of more steamers to the lines shows the prosperity of the firms that operate them under charter from their British owners.

South America lies so far to the east of North America that the New York merchant is at a disadvantage as compared with the European shipper in securing the South American trade. The meridian of Washington cuts through western Peru and passes out into the Pacific. The nitrate ports of Chile have the longitude of Boston, and the coast of Brazil is 2,600 miles east of New York. As the vessels from New York to the west coast must round this easterly point, steamers from New York have no advantage over the vessels from the English Channel. The ports of southern Europe are nearer to Brazil than is New York. Prior to 1890 we carried all our commerce to the west coast in sailing vessels, whose course from our Atlantic seaboard must be eastward to the vicinity of the Azores before the ships can get into the trade winds that will carry them past the Brazilian capes. This detour has placed a ten days' handicap upon the greater part of our trade with Western South America. The future will be different. Any European

advantage of rates, steamer connections or distance may be expected to disappear not long after the opening of a canal across the American isthmus.

By the present route it is farther from New York to Guayaquil than from New York to China. With the new highway in use, the Pacific shore of South America will be as accessible as our own Pacific Coast. If the Panama Canal is built, Guayaquil will be 180 miles nearer to New York than is Liverpool. By the Nicaragua Canal, it will be 1,200 miles farther from New York to San Francisco than from New York to Callao, Peru, and the distance from New York to San Francisco will be only fifty-four miles less than that from New York to Valparaiso, Chile. New York will be farther from the cities of Puget Sound than from any Pacific port of South America. Our Gulf ports of New Orleans and Mobile are 800 miles nearer to the Pacific than is New York, while the canal gives all our ports from 2,000 to 3,000 miles advantage over the commercial centres of Europe when trading through the same waterway.

This great reduction in distance will affect rates and lead to the establishment of direct and adequate steamer connections. Moreover, our export trade will probably be sought for by outgoing European vessels calling at our ports on their way to South America. A steamer from Liverpool to the entrance of either canal can call at New York by adding only 320 miles to her voyage, a day and a third for a ten-knot steamer. At the rate of \$250 per day, that detour would be paid for by a difference of fifty cents per ton on 666 tons of coal, and American coal is cheaper than British. It therefore seems reasonable to expect our export rates to be more favorable than those of Europe. A great growth in our Western South American trade will follow from these advantages of transportation; because no other part of the world has more fundamental reasons than Western South America has for the growth of commercial exchanges with this country. Our South American trade is of a more

complementary character than that of Europe with that continent, or than that of our own trade in any other part of the globe. We export to many countries, but it is only from South America that our imports exceed our exports.

Our factories need the raw materials produced in Western South America, and we will continue to need, in increasing quantities, the nitrates, the ores, the wool and hides, the sugar and cacao and cotton. In return, the producers of these articles require supplies almost identical to those we are now sending to Montana and Colorado, all kinds of dry goods, groceries, and agricultural and mining machinery and supplies. South America is an agricultural and mining frontier, and our resources of iron and wood, and our mechanical skill place us in good position to furnish the appliances needed to develop such resources. The demand for raw materials in this country and for bulky manufactures in Western South America, will furnish cargo both ways for the ships engaged in the trade. Such constant employment for the ship means lower rates both ways, an advantage now possessed by the countries of Europe, but not by the United States.

The basis for the growth of commerce between this country and Western South America, can be shown plainly by an examination of the trade conditions and resources in some of the industrial sections of this part of the continent.

The foreign commerce of Chile now amounts to about \$100,000,000, and is increasing. In 1899, the exports were \$59,000,000, and the imports \$39,000,000; about nine-tenths of the imports came from Europe, while nineteen-twentieths of the exports went to that continent. Our trade is slight compared with that of the United Kingdom, Germany or France. An examination of the elements of the trade of Chile reveals why the United States is particularly interested in it, and why the canal will increase our share.

Of the Chilean exports, nitrate of soda comprises nearly 60 per cent, although the percentage is slightly declining owing to the increased export of copper and copper ores. Next in the order of importance comes silver and silver ores, then wheat and barley, wool, hides, and other scattering agricultural and mineral products, most of which are needed in the United States. We need the nitrate for our fertilizers and chemical manufactures, we have the coal to smelt the copper and silver ores, we need the wool for our carpet manufactures and the hides to furnish raw materials for our leather manufactures. Of course, the grain products are needed only in Europe.

Of the Chilean imports, cotton manufactures comprise by far the largest part. Then comes machinery of all kinds, kerosene, woolens, coal, bagging and all kinds of miscellaneous manufactures and supplies. The cotton manufactures are made of the raw material that grows in the southern part of the United States, and is carried to Europe for manufacture whence the goods are shipped through the Straits of Magellan. Much of that cotton cloth will in the future go direct from American mills via New York, Charleston, Mobile or New Orleans and save transshipments, and seven thousand miles or more of transportation. We have the materials and manufacturing ability to furnish the Chileans their machinery; we are now furnishing them with kerosene, and, when the canal is opened, we will probably be able to send the coal and many miscellaneous manufactures.

The reduction in freight rates that may be expected to follow the opening of the canal will not only extend the present lines of our trade with Western South America, but will change the character and increase the number of the articles entering into it. With a few exceptions, the goods Chile secures in this country are those which we produce under especially favorable circumstances: lard, lumber, kerosene, breadstuffs, patented articles such as medicines, firearms,

electrical appliances, farming machinery and improved hardware. These articles can be sold more readily in Chile after the canal has been opened. We have just begun to send iron and steel to Chile. The bulk of the pig, bar and hoop iron, and rails and castings now come from Europe, although we can make them more cheaply than our European rivals can. The railroads of Chile have iron rails that must soon be changed for steel which the mills of the United States will be in the best position to supply. We are already sending locomotives and cars. The towns and cities of Chile will use an increasing amount of structural iron for building purposes, and this will naturally come from our country and by the same route as the steel rails and machinery. The growing use of electricity in a country having many mountain streams for water power, will open up a demand for electrical machinery which American manufacturers are already able to supply. We are sending small quantities of many other articles in the cost of which transportation is a large factor, viz: earthenware, glass and glassware, cordage, paper and coal. Our cotton exports to Chile consist mainly of one or two plain staple grades made without reference to the Chilean market, and shipped in bulk as chance opportunities occur. With canal transportation and attention given to the demands of the market, that business can be greatly extended.

Less than half of the tillable surface of Chile is cultivated, but its new territories are being developed. For three-fourths of the agriculture improved plows and farming machinery are used, two-thirds of the supply being furnished by the United States. The other fourth of the work is done with the prehistoric wooden plow; the wheat being threshed by treading it out with horses. The nearness of the country to water transportation makes the introduction of foreign improvements easy and increases the possibilities of foreign trade. With improvements in the means of connection with other countries production will

increase and the population will grow, and the United States will be in a position to profit by it. Chile has one-third of the population and two-thirds of the commerce of Western South America, her per capita commerce being four times as large as that of the tropical countries of Western South America. She has also more domestic manufactures, and their increase promotes foreign trade.

The northern half of Western South America has lagged behind Chile. Revolutions and civil wars have been frequent, the governments are weak, and, owing to the instability of affairs, capitalists have been frightened away. These conditions will gradually disappear as industry and prosperity increase. The Argentine Republic, Mexico and Chile are examples of Spanish-American peoples who have secured fairly stable political conditions and are improving their industries. Ecuador and Peru are now enjoying a period of quiet and prosperity that has lasted several years, and foreign capital is being invested in moderate quantities. Permanent peace cannot safely be predicted, but as prosperity increases, and more capital comes in, the forces that make for stable political conditions will be stronger. Capitalists have in the past been deterred from utilizing many valuable opportunities. However, the managers of foreign corporations in Peru report that their actual losses are surprisingly small. Political disturbances do not often seriously interfere with the foreign corporations engaged in the extractive industries of agriculture and mining, or in transportation. With the merchant it is different, because purchases are stopped during periods of political disturbance.

Western South America, like all new countries, depends upon foreign capital for its progress. To the use of foreign capital has been due the development of Australia, South Africa, the western commonwealths of this country, and what progress there has been made in South America. Foreigners, mostly Europeans, own the steamers of the Amazon, the railroads of Brazil and Argentine, the nitrate works of

Chile and the sugar plantations of Peru. Frenchmen own the coffee estates of Brazil, Scotchmen own the flocks of Argentine and Terra del Fuego, and German merchants control the wholesale trade of many South American cities. The foreign capital must be managed by foreigners for the present, at least, and probably for many years to come.

The supply of capital for South America will in the future come from the United States as well as from Europe. We have become large exporters of the iron and steel and machinery needed by new countries. Our increasing wealth and population will furnish money and men for industrial enterprises in foreign lands. American ownership and direction of railroads, mines and other enterprises in Mexico have been chiefly responsible for the industrial revolution in that country during the past twenty years, and for the accompanying expansion of her commerce, the chief part of which has been with the United States. This work is still going steadily forward in Mexico, but we shall welcome the opportunities lying beyond the Isthmus of Panama that will be made accessible to us by the isthmian canal.

The capitalistic development of Western South America, particularly of the northern part, has barely begun. It has great stores of natural wealth, but obstacles in the way of their exploitation have thus far delayed the development of the section. Large organizations of capital are necessary; indeed, successful enterprises in the Andean region must be on a larger and more comprehensive scale than on the level plains of Argentine. In Argentine the European owner cultivates his grain and pastures his flocks on a level plain; but in Peru irrigation is necessary to agriculture. There is, however, no business more surely profitable than agriculture under irrigation, notwithstanding the necessarily heavy outlay of capital. The construction of a railroad across the level pampas, to carry away the wool and grain of Argentine, is a very much easier task than building a line up the defiles of the Andes to tap the mineral wealth of the plateau.

Operations on the east side can be conducted with moderate capital, but on the west side the large capitalist, the mining expert and the complicated machine are necessary. But the return promises to be all that can be desired. The efficiency of consolidated capital in Western South America has already been shown, as it has produced the greater part of the commodities now exported. Chile exports one and a half million tons of nitrate of soda per year, and it has been mined by firms that own the nitrate fields, the reducing plants, the railroads and the piers from which it is shipped to Europe. The irrigated sugar plantations of Peru are equally complete. Nearly all of the existing and projected plans for development of the resources in this part of the continent include also some system of improved transportation, without which exploitation is impossible.

Among the many opportunities for such large investments of capital, two may be mentioned—mining in the Andes and agriculture by irrigation on the coast of Peru. This coast section has a dry climate, a rich soil, a good supply of water and room for a considerable extension of cultivation. At the time of the Spanish Conquest the population was several times as great as it is at present, and a much larger proportion of the soil was irrigated. Many crops are grown, but sugar and cotton are the chief exports and both come to this country. Sugar cane is cut eight or ten times without replanting, and the annual crop is over 100,000 tons and is increasing. It is claimed that sugar can be produced more cheaply there than in any other country. American machinery and American capital are already in use.

Peruvian cotton is a special product with a brown color and a curly fibre, useful for mixing with wool. It is called "vegetable wool" and has a high value. The cotton plant reaches the size of a small tree, lives for years, produces two crops per annum, the present small output being grown, with practically no cultivation, in the moist soil near the streams. With the establishment of proper irrigation

works the cotton crop, like the sugar crop, will be greatly increased, and another raw material furnished to our factories. Our present imports come via London or Liverpool.

The Andean plateau is the greatest untouched source of wealth in all South America. This section is as long as our Rocky Mountain region from Mexico to Canada, has an equal or greater number of mountain ranges, contains the same general geologic formations, probably has greater mineral resources and has a population between three and four times that of the North American plateau. As the climate of the whole section is temperate the population can be made fairly efficient industrially.

At present nearly all of this plateau region is cut off from the outside world except by such connection as is afforded by the pack-mule traversing Andean trails. Foreign trade consists only of a small export of wool, hides and valuable ores sent out at great cost in return for miscellaneous manufactures. The people raise their own food, often spin their own thread, make their own clothes and live in huts built without nails. Yet this is the region that furnished the greater part of the bullion supply of the world for three hundred years. During this century it has been left behind by the development of more accessible fields. The crude and wasteful mining methods of the old Spanish taskmasters still prevail. The Indian burrows through the veins of silver, tin or copper ore, carrying out the best of it in a rawhide sack, breaking it with a hammer, and sending the richest of it on muleback to the seacoast for shipment to Europe. The mines are unventilated, and when water is struck they must be abandoned, unless they can be baled out by a bucket brigade. The famous mines of Potosi reported to have yielded three billion dollars in silver, are reached only by a bridle path, and in this particular they are like the other great metal producers of the past.

The simplest mining operations require heavy machinery that can be carried only by rail or water transportation.

With the extension of the Andean railroad lines improved machinery like that used in Colorado and Montana will be introduced. Drowned mines can be pumped out and with hoisting and ventilating machinery worked to five or ten times their present depth. Low grade ores can be handled by the mills and crushers and transported by rail. By the present wasteful methods silver ores worth thirty dollars per ton are thrown away in Peru, when ores one-fourth as rich are profitably worked in the United States. Copper ore under thirty per cent pure is left at the Peruvian and Bolivian mines, while fortunes are being made in this country by smelting ores with three or four per cent copper. The rich heaps of refuse ore left by the Andean miners of the past four centuries, and thousands of abandoned mines can be profitably re-worked by using modern machinery. The mines of Cerro Pasco, Peru, are said to contain enough low grade copper ore to fully employ the railroad that is now planned to develop them. This vicinity and Northern Peru have coal deposits also, but fuel for power plants will generally be scarce on the plateau. Fortunately the mining companies can use electricity generated by water power, of which the melting snows furnish a steady and abundant supply. The streams descend from an altitude of 14,000 feet to the plains below and give opportunity for the installation of widely distributed plants.

The building of these railroads and the establishment of electric and mining plants will be much easier after the isthmian canal has opened a shorter highway to the North Atlantic. It will also give the United States the chance to furnish the machinery and smelt the ores. We are already beginning to get some of the ore which our cheap coal supply enables us to smelt to good advantage.

The improvements in mining methods described above have actually taken place near the two lines of railroad that have reached the edge of the plateau in the region of Lake Titicaca. Large corporations have run mines after the plan

prevailing in our Western States. The plateau needs only the continuation and multiplication of processes that are now in operation in its southwestern corner. One of the two railroads is being extended and the other is surveying for an extension.

The food supply of the plateau is limited to wheat, beans, potatoes and other temperate zone products. Tropic products come from the lower valleys on the eastern slope, and since much of the plateau is treeless there is a large trade in wood as well as food products. All the freight comes up by pack animals, an expensive process that will be replaced by electric railroads when the demand grows to larger proportions because of the industrial development of the plateau. Many of these eastern valleys have rich, fine soil, a subtropical climate and valuable deposits of gold. These districts will be developed from the plateau and will export any surplus by way of the Pacific. This slope already sends over the Andes some coffee, cocoa and hides, and a large share of the world's supply of coco leaves for the manufacture of cocaine.

In the northern part of the Andean region is the Cauca Valley. Its elevation gives it a warm climate, but the section is truly Andean, inasmuch as it is cut off from the ocean by a range of mountains and has to depend upon pack-mule transportation for all of its commerce. The people do a little gold mining, but live chiefly by agriculture, importing nearly all of their merchandise except some domestic manufactures of straw hats, coarse cloths and utensils. The skill of the artisan is attested by their fairly neat homes and wooden bridges with spans as great as eighty feet in length.

All the internal traffic of the valley as well as its foreign trade is carried on over trails so bad that oxen are sometimes preferred to the less sure-footed mule. The load that the American farmer puts on a two-horse wagon is there divided up into packs for twenty-five animals. The exports of agricultural products are limited to the most valuable

articles, such as coffee and cocoa of the best grades, although corn, sugar, tobacco and fruits are cultivated, and cattle are raised.

Concessions have been given for a railroad to go through the valley from the port of Buenaventura and twenty miles of the line have been built, but the enterprise is now in suspense. The completion of this line and the opening of an isthmian canal will bring the producing districts of the valley thousands of miles nearer to the commercial world. At present, Buenaventura, its port, is in the traffic territory of the Panama railroad and steamship lines. This is declared by commercial writers to be sufficient to stagnate the trade of the Pacific Coast. During the high steamer rates of the year 1900, such typical articles as wire and nails were taken from New York to China for \$8 a ton, but it cost \$15 a ton to land them at Buenaventura, 7,000 miles nearer. From there the costs were \$8 per ton to the end of the railroad, and \$40 per ton additional by pack-mule over the pass of the Andes, 6,000 feet in elevation, to Cali, seventy-seven miles from the ocean. The mule transportation cost seventy cents per ton per mile. After reaching Cali some of the goods had to double the freight charge of \$63 per ton by being carried many miles up and down the valley. At the same time the steel manufacturers of Pittsburg were paying an unusually high freight charge of \$3.60 per ton to the seaboard.

The opening of the isthmian canal, the building of the railroad, and the introduction of foreign capital will be revolutionary in their effect upon the trade of the Cauca Valley. The first effect of the building of the railroad will be the importation of machinery for agriculture and the smaller industries, and the valley will export coffee, cacao, animal products and raw sugar.

Western South America is an undeveloped agricultural and mining region offering an opening for American capital and promising by its industrial growth to increase the pro-

portion of its trade with the United States. An isthmian canal will furnish the avenue for marketing the products and supplying the machinery needed to utilize the resources of large territories that now carry on their internal commerce in a fashion more primitive than prevailed in our Great West in the period when the prairie schooner was the only land transportation agent west of the Missouri River. Western South America is certain to need a great variety of the manufactures we can produce to advantage, and no other division of the world will furnish us more of the raw materials needed by our industries.

J. RUSSELL SMITH.

Washington, D. C.